

FLAME RETARDANT UREA-BIO BASED URETHANE COMPOSITIONS

This patent application is a continuation-in-part of patent application No. 09/941,402 filed 08/30/01, which is a continuation-in-part of 09/532,646 filed 03/22/2000, which is a continuation-in-part of 08/801,776 filed 02/14/97, now Patent No. 5,788,915; which is a continuation-in-part of 08/723,779 filed 09/30/96 now Patent No. 5,854,309 and a division of 09/149,847 filed 09/08/98 now Patent No. 6,258,298.

FIELD

The invention concerns urea compounds and bio based compounds reacted with polyisocyanates to produce flame retarded urethane products. The invention also concerns their preparation and use. The urea compounds with bio based compounds reacted with polyisocyanates are useful to produce flame retardant urethane plastics. The urea compounds and may be reacted with phosphorus and/or boron containing compounds to produce other flame retardant compounds. The urea compounds may also be reacted with aldehydes to produce amino condensation-aldehyde resins for use with bio based compounds a flame retardant urethanes.

BACKGROUND

The urea and urea compounds produced by heating of urea to produce urea condensation compounds, such as a mixture of urea, biuret, cyanuric acid and cyamelide, is known in the arts, but the use of these compounds with bio based compounds as a flame retardant is novel. The urea condensation compounds and their phosphorus and/or boron salts are used as flame retardant compounds in plastics and natural products. Urea and melamine were utilized as a flame retardant compound by Fracalossi, et al., in U.S. Patent No. 4,385,131. Melamine was utilized as flame retardant compounds in polyurethanes by Yukuta, et al., in U. S.